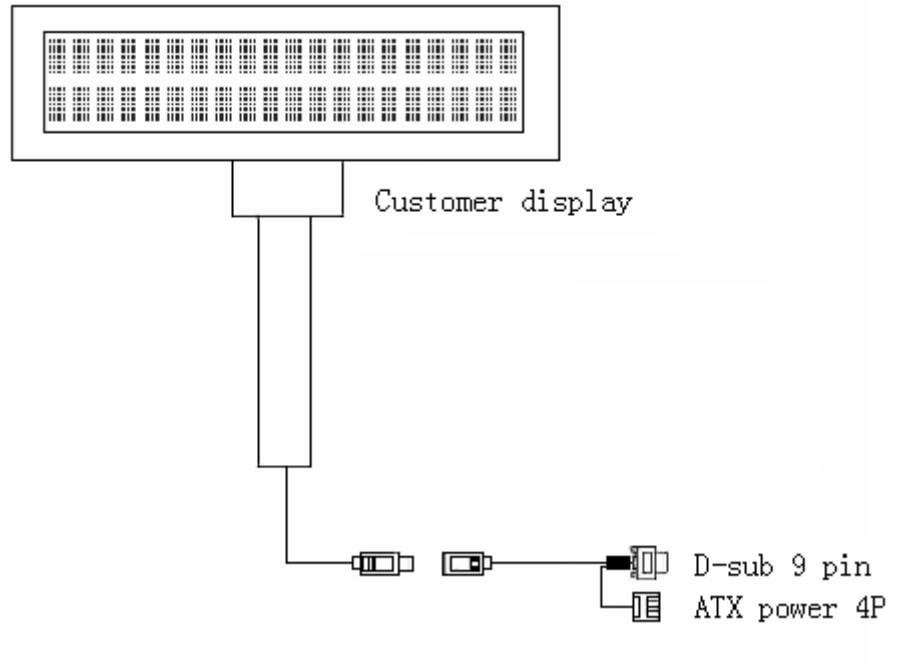
User's Manual

Models VFD220E

Vacuum Fluorescent Customer Display



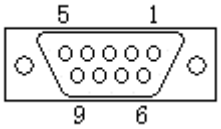
INTERFACE SPECIFICATIONS

1. Communication

The interface specification are based on EIA RS232C baud rate 9600 bps, 8 data bits, no parity, 1 stop bits.

2. RS232C Connector

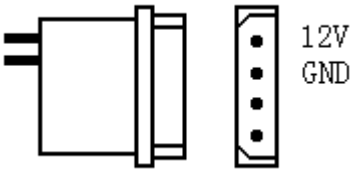
Connector type: D-sub 9 pin (Female)



Pin number	Signal name	signal dirction DISPLAY-HOST
1	CD	-----
2	RXD	-----
3	TXD	<-----
4	DTR	-----
5	GND	<--->
6	DSR	-----
7	RTS	-----
8	CTS	-----
9	RI	-----

3. Power connector

Connector type:ATX POWER 4P(12V)



General commands：

1. STX B n

Name：select baud rate

ACSII：STX B n

Decimal：2 66 n

Hex：02 42 n

Description：When the power is turned on, the default value of n is 0(set to 9600)

ASCII n	Decimal n	Hex n	Baud rate
0	48	30H	9600
1	49	31H	4800
2	50	32H	2400
3	51	33H	1200
4	52	34H	600
5	53	35H	300

2. STX C n

Name：select command set

ACSII：STX C n

Decimal：2 67 n

Hex：02 43 n

Description：When the power is turned on, the default value of n is 0(set to CD5200/20)

ASCII n	Decimal n	Hex n	Command set
0	48	30H	CD5200/20
1	49	31H	ESC/POS

CD 5200/20 commands

1. ESC DC1

Name：Select overwrite mode

ACSII：ESC DC1

Decimal：27 17

Hex：1B 11

Description：In overwriting mode, entering a character code moves to the left end of the lower line when the cursor is at the right end of the upper line, and to the left end of the upper line when the cursor is at the right end of the lower line. When the power is turned on, this mode is selected defaultly.

2. ESC DC2

Name：Select vertical scroll mode

ACSII：ESC DC2

Decimal：27 18

Hex：1B 12

Description：In vertical scroll mode, entering a character code moves the cursor to the left end of the lower line when the cursor ia at the right end of the upper line, scrolls the characters displayed on the lower line, and clears the lower line when the cursor is at the right end of the lower line. At this time the cursor is moved to the left end of the lower line.

3. ESC DC3

Name：Select horizontal scroll mode

ACSII：ESC DC3

Decimal：27 19

Hex：1B 13

Description：In horizontal scroll mode, entering a character code scrolls all displayed characters one character to the left, then displays the new character at the right end.

4. ESC Q A d1 d2 d3 …… dn CR

Name：set the string display mode, write string to upper line

ACSII：ESC Q A d1 d2 d3 …… dn CR

Decimal：27 81 65 d1 d2 d3 …… dn 13

Hex：1B 51 41 d1 d2 d3 …… dn 0D

Description：write string (d1 d2 d3 …… dn) to upper line. 20H<=dn<=FFH, 1<= n<=20.

5. ESC Q B d1 d2 d3 …… dn CR

Name：set the string display mode, write string to lower line

ACSII：ESC Q B d1 d2 d3 …… dn CR

Decimal：27 81 66 d1 d2 d3 …… dn 13

Hex：1B 51 42 d1 d2 d3 …… dn 0D

Description：write string (d1 d2 d3 …… dn) to lower line. 20H<=dn<=FFH, 1<= n<=20.

6. ESC Q D d1 d2 d3 …… dn CR

Name：upper line message scroll continuously

ACSII：ESC Q D d1 d2 d3 …… dn CR

Decimal：27 81 68 d1 d2 d3 …… dn 13

Hex：1B 51 44 d1 d2 d3 …… dn 0D

Description：upper line message (d1 d2 d3 …… dn) scroll continuously. 20H<=dn<=FFH, 1<= n<=20.

7. ESC [D

Name：move the cursor one character position to the left

ACSII：ESC [D

Decimal：27 91 68

Hex：1B 5B 44

Description：When the cursor is at the left end of a line, the operation of this command depends on the display mode.

1) Overwrite mode : When the cursor is at the end of the lower line, it is moved to the right end of the upper line. When it is at the end of the upper line, it is moved to the right end of the lower line.

2) Vertical scroll mode : When the cursor is at the end of the lower line, it is moved to the right end of the upper line. When it is at the end of the upper line, the display on the upper line is scrolled to the lower line and the upper line is cleared. At this time the cursor is moved to the right end of the upper line.

3) Horizontal scroll mode : All characters on the current line are scrolled on character to the right. The cursor is not moved, but the character area at the left end is cleared.

8. BS

Name：move the cursor one character position to the left

ACSII：BS

Decimal：8

Hex：08

Description：When the cursor is at the left end of a line, the operation of this command depends on the display mode.

1) Overwrite mode : When the cursor is at the end of the lower line, it is moved to the right end of the upper line. When it is at the end of the upper line, it is moved to the right end of the lower line.

2) Vertical scroll mode : When the cursor is at the end of the lower line, it is moved to the right end of the upper line. When it is at the end of the upper line, the display on the upper line is scrolled to the lower line and the upper line is cleared. At this time the cursor is moved to the right end of the upper line.

3) Horizontal scroll mode : All characters on the current line are scrolled on character to the right. The cursor is not moved, but the character area at the left end is cleared.

9. ESC [C

Name：move the cursor one character position to the right

ACSII：ESC [C

Decimal：27 91 67

Hex：1B 5B 43

Description：When the cursor is at the right end of a line, the operation of this command depends on the display mode.

1) Overwrite mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, it is moved to the left end of the upper line.

2) Vertical scroll mode : When the cursor is at the right end of the upper line, it is moved to

the left end of the lower line. When it is at the right end of the lower line, the display on the lower line is scrolled to the upper line and the lower line is cleared.At this time, the cursor is moved to the left end of the lower line.

3)Horizontal scroll line : All characters on the current line are scrolled one character to the left.The cursor is not moved, but the character area at the right end is cleared.

10. HT

Name：move the cursor one character position to the right

ACSII：HT

Decimal：9

Hex：09

Description：When the cursor is at the right end of a line, the operation of this command depends on the display mode.

1) Overwrite mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, it is moved to the left end of the upper line.

2) Vertical scroll mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, the display on the lower line is scrolled to the upper line and the lower line is cleared.At this time, the cursor is moved to the left end of the lower line.

3)Horizontal scroll line : All characters on the current line are scrolled one character to the left.The cursor is not moved, but the character area at the right end is cleared.

11. ESC [A

Name：move the cursor up one line

ACSII：ESC [A

Decimal：27 91 65

Hex：1B 5B 41

Description：When the cursor is on the upper line, the operation of this command depends on the display mode,as follows:

1)Overwrite mode :The cursor is moved to the same column on the lower line.

2)Vertical scroll mode :The characters displayed on the upper line are scrolled to the lower line and the upper line iscleared. The cursor remains at the same position.

3)Horizontal scroll mode :The cursor is not moved.

12. ESC [B

Name：move the cursor down one line

ACSII：ESC [B

Decimal：27 91 66

Hex：1B 5B 42

Description：When the cursor is on the lower line, the operation of this command depends on the display mode,as follows:

1)Overwrite mode :The cursor is moved to the same column on the upper line.

2)Vertical scroll mode :The characters displayed in the lower line are scrolled to the upper

line and the lower line is cleared. The cursor remains at the same position.

3)Horizontal scroll mode :The cursor is not moved.

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13. LF

Name：move the cursor down one line

ACSII：LF

Decimal：10

Hex：0A

Description：When the cursor is on the lower line, the operation of this command depends on the display mode,as follows:

1)Overwrite mode :The cursor is moved to the same column on the upper line.

2)Vertical scroll mode :The characters displayed in the lower line are scrolled to the upper line and the lower line is cleared. The cursor remains at the same position.

3)Horizontal scroll mode :The cursor is not moved.

14. ESC [H

Name：move cursor to home position

ACSII：ESC [H

Decimal：27 91 72

Hex：1B 5B 48

Description：Moves the cursor to the left-end position on the upper line (home position).Home position indicates the first column of the upper line.

15. HOM

Name：move the cursor to the left-end position on the upper line (home position)

ACSII：HOM

Decimal：11

Hex：0B

16. ESC [K

Name：move the cursor to the 20th column of the lower line

ACSII：ESC [K

Decimal：27 91 75

Hex：1B 5B 4B

17. ESC [L

Name：move the cursor to left-most position on the current line

ACSII：ESC [L

Decimal：27 91 76

Hex：1B 5B 4C

18. CR

Name：move the cursor to left-most position on the current line

ACSII：CR

Decimal：13

Hex：0D

19. ESC [R

Name：move the cursor to the right-end position on the current line

ACSII：ESC [R

Decimal：27 91 82

Hex：1B 5B 52

20. ESC l x y

Name：move cursor to specified position

ACSII：ESC l x y

Decimal：27 108 x y

Hex：1B 6C x y

Description：moves the cursor to the *x*th column on the *y*th line.1<=x<=20,y=1,2

21. ESC @

Name：initialize display

ACSII：ESC @

Decimal：27 64

Hex：1B 40

Description：The software settings are reset to their power-on values. After initializing the display, the display screen is cleared and the cursor moves to the home position.

22. CLR

Name：clear display screen

ACSII：CLR

Decimal：12

Hex：0C

Description：Clear all the displayed characters.After this command is executed, the cursor moves to the home position.

23. CAN

Name：clear cursor line, and clear string mode

ACSII：CAN

Decimal：24

Hex：18

Description：Clears the line containing the cursor.After this command is executed, the cursor moves to the left-end position on the current line.

24. ESC * n

Name：brightness adjustment

ACSII：ESC * n

Decimal：27 42 n

Hex：1B 2A n

Description：Sets the brightness of the vacuum fluorescent character display tube.n selects the percentage of brightness as follows:

n = 1, Brightness Level = 40 %

n = 2, Brightness Level = 60 %

n = 3, Brightness Level = 80 %

n = 4, Brightness Level =100 %

When the power is turned on, *n* =4 is selected defaultly.

25. ESC _ n

Name：set cursor ON/OFF

ACSII： ESC _ n

Decimal：27 95 n

Hex：1B 5F n

Description：Turns the cursor on or off.

When n =0, the cursor is turned off.

When n =1, the cursor is turned on.

26. ESC f n

Name：select international fonts set

ACSII：ESC f n

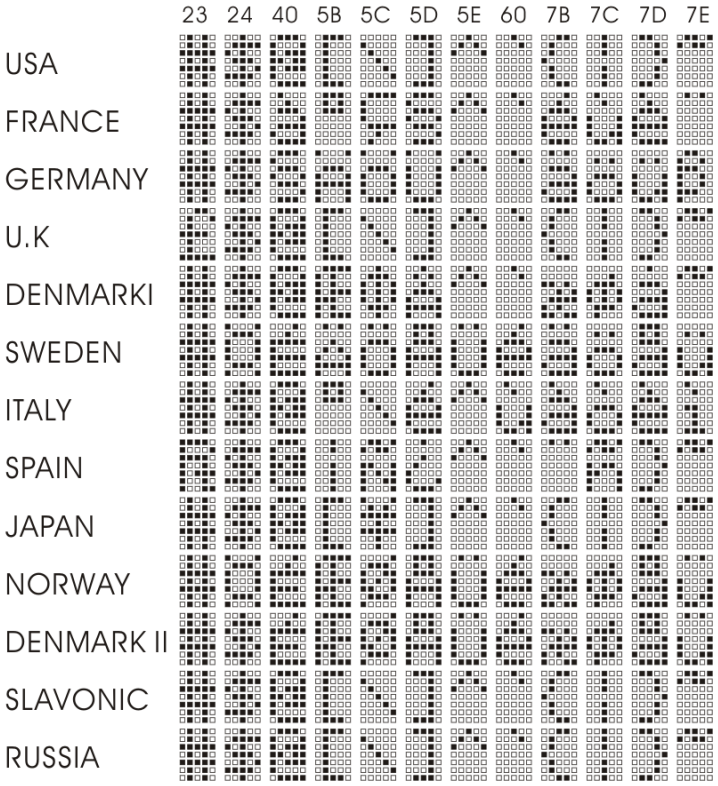
Decimal：27 102 n

Hex：1B 66 n

Description：When the power is turned on, the default value of n is A(set to U.S.A.)

ASCII n	**Decimal n**	**Hex n**	**Country**
A	65	41H	U.S.A
D	68	44H	DENMARKI
E	69	45H	DENMARKII
F	70	46H	FRANCE
G	71	47H	GERMANY
I	73	49H	ITALY
J	74	4AH	JAPAN.
L	76	4CH	SLAVONIC
N	78	4EH	NORMAY
R	82	52H	RUSSIA
S	83	53H	SPAIN
U	85	55H	U.K.
W	87	57H	SWEDEN

国际字符码表（主要列出不同的内容）



27. ESC c n

Name：select fonts ,ASCII code or JIS code

ACSII： ESC c n

Decimal：27 99 n

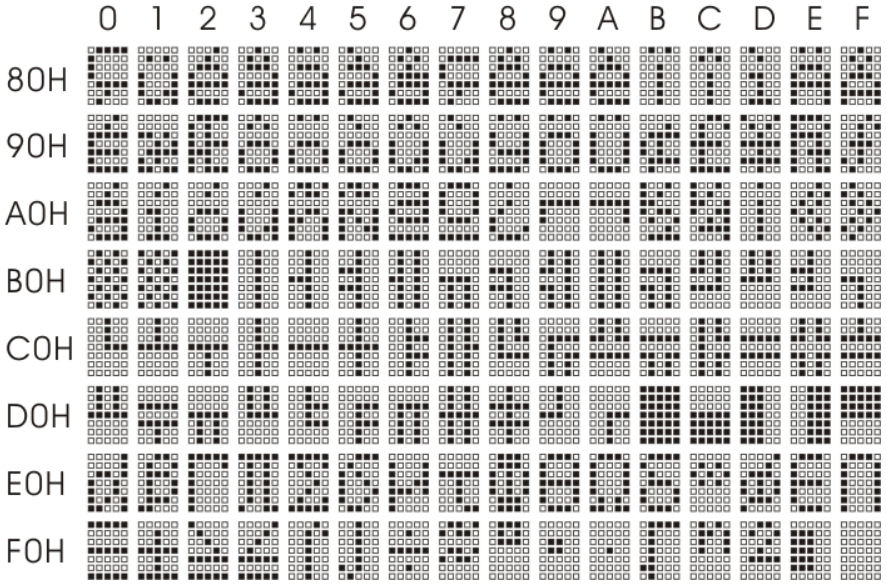
Hex：1B 63 n

Description：When the power is turned on, the default value of n is A(set to U.S.A. and Standard Europe)

ASCII n	**Decimal n**	**Hex n**	**character code table(80H…FFH)**
A	64	41H	U.S.A. and Standard Europe
J	74	4AH	Katakana for Japan
L	76	4CH	SLAVONIC
R	82	52H	RUSSIA

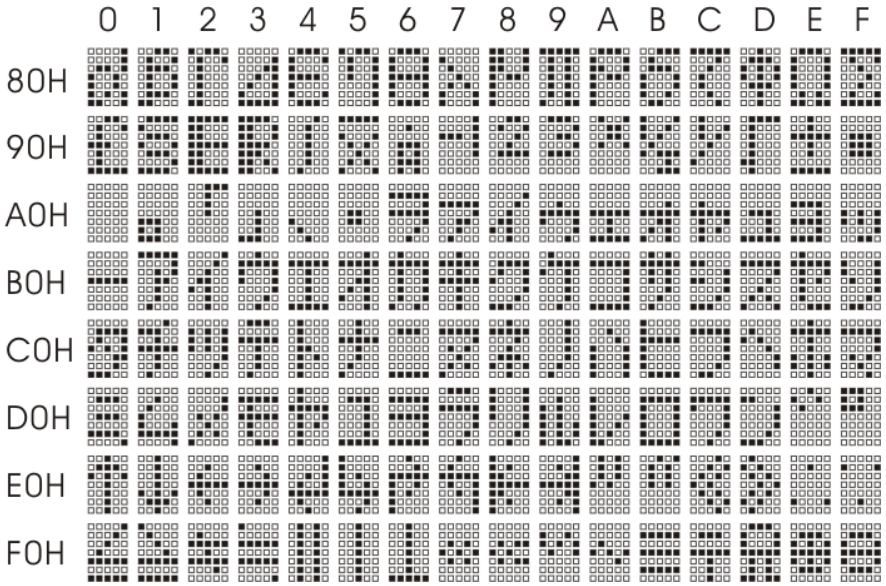
扩展字符字体表

Standard Europe



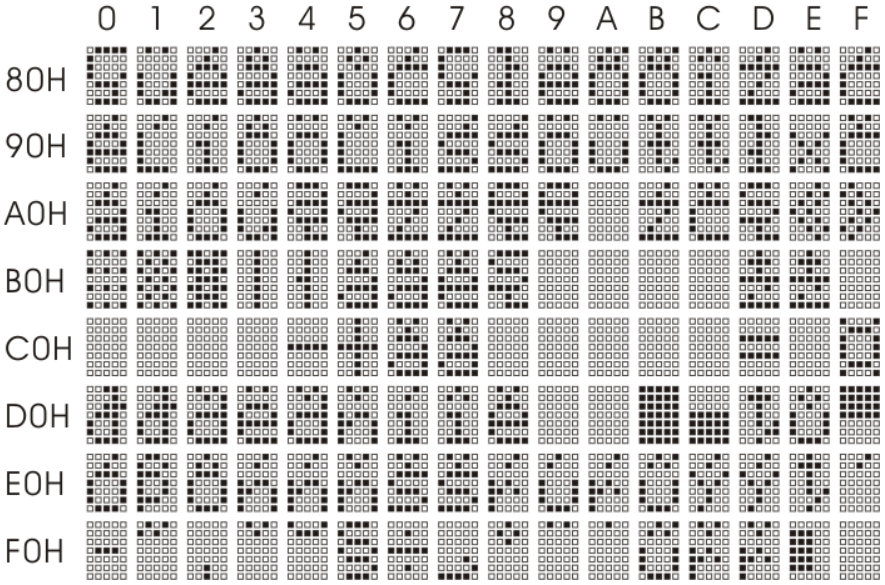
扩展字符字体表

Katakana



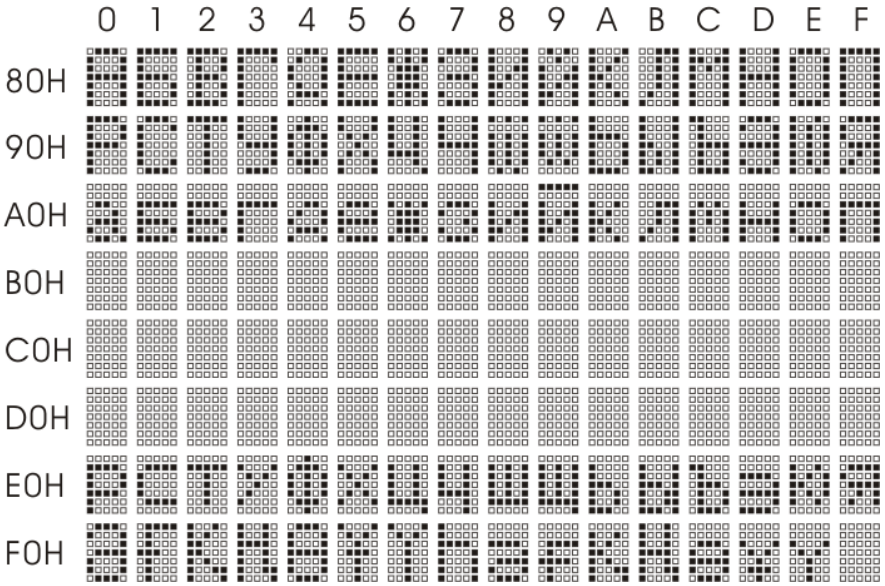
扩展字符字体表

SLAVONIC



扩展字符字体表

RUSSIA



EPSON ESC/POS commands

1. US MD1

Name：Select overwrite mode

ACSII：US MD1

Decimal：31 1

Hex：1F 01

Description：In overwriting mode, entering a character code moves to the left end of the lower line when the cursor is at the right end of the upper line, and to the left end of the upper line when the cursor is at the right end of the lower line. When the power is turned on, this mode is selected defaultly.

2. US MD2

Name：Select vertical scroll mode

ACSII：US MD2

Decimal：31 2

Hex：1F 02

Description：In vertical scroll mode, entering a character code moves the cursor to the left end of the lower line when the cursor ia at the right end of the upper line, scrolls the characters displayed on the lower line, and clears the lower line when the cursor is at the right end of the lower line. At this time the cursor is moved to the left end of the lower line.

3. US MD3

Name：Select horizontal scroll mode

ACSII：US MD3

Decimal：31 3

Hex：1F 03

Description：In horizontal scroll mode, entering a character code scrolls all displayed characters one character to the left, then displays the new character at the right end.

4. BS

Name：move the cursor one character position to the left

ACSII：BS

Decimal：8

Hex：08

Description：When the cursor is at the left end of a line, the operation of this command depends on the display mode.

1) Overwrite mode : When the cursor is at the end of the lower line, it is moved to the right end of the upper line. When it is at the end of the upper line, it is moved to the right end of the lower line.

2) Vertical scroll mode : When the cursor is at the end of the lower line, it is moved to the right end of the upper line. When it is at the end of the upper line, the display on the upper line is scrolled to the lower line and the upper line is cleared. At this time the cursor is moved to the right end of the upper line.

3) Horizontal scroll mode : All characters on the current line are scrolled on character to the

right. The cursor is not moved, but the character area at the left end is cleared.

5. HT

Name：move the cursor one character position to the right

ACSII：HT

Decimal：9

Hex：09

Description：When the cursor is at the right end of a line, the operation of this command depends on the display mode.

1) Overwrite mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, it is moved to the left end of the upper line.

2) Vertical scroll mode : When the cursor is at the right end of the upper line, it is moved to the left end of the lower line. When it is at the right end of the lower line, the display on the lower line is scrolled to the upper line and the lower line is cleared.At this time, the cursor is moved to the left end of the lower line.

3)Horizontal scroll line : All characters on the current line are scrolled one character to the left.The cursor is not moved, but the character area at the right end is cleared.

6. US LF

Name：move the cursor up one line

ACSII：US LF

Decimal：31 10

Hex：1F 0A

Description：When the cursor is on the upper line, the operation of this command depends on the display mode,as follows:

1)Overwrite mode :The cursor is moved to the same column on the lower line.

2)Vertical scroll mode :The characters displayed on the upper line are scrolled to the lower line and the upper line iscleared. The cursor remains at the same position.

3)Horizontal scroll mode :The cursor is not moved.

7. LF

Name：move the cursor down one line

ACSII：LF

Decimal：10

Hex：0A

Description：When the cursor is on the lower line, the operation of this command depends on the display mode,as follows:

1)Overwrite mode :The cursor is moved to the same column on the upper line.

2)Vertical scroll mode :The characters displayed in the lower line are scrolled to the upper line and the lower line is cleared. The cursor remains at the same position.

3)Horizontal scroll mode :The cursor is not moved.

8. CR

Name：move the cursor to left-most position on the current line
ACSII：CR
Decimal：13
Hex：0D

9. US CR

Name：move the cursor to the right-end position on the current line
ACSII：US CR
Decimal：31 13
Hex：1F 0D

10. HOM

Name：move the cursor to the left-end position on the upper line (home position)
ACSII：HOM
Decimal：11
Hex：0B

11. US B

Name：move the cursor to the 20th column of the lower line
ACSII：US B
Decimal：31 66
Hex：1F 42

12. US $ x y

Name：move cursor to specified position
ACSII：US $ x y
Decimal：31 36 x y
Hex：1F 24 x y
Description：moves the cursor to the *x*th column on the *y*th line.1<=x<=20,y=1,2

13. ESC @

Name：initialize display
ACSII：ESC @
Decimal：27 64
Hex：1B 40
Description：The software settings are reset to their power-on values. After initializing the display, the display screen is cleared and the cursor moves to the home position.

14. CLR

Name：clear display screen
ACSII：CLR
Decimal：12
Hex：0C
Description：Clear all the displayed characters.After this command is executed, the cursor

moves to the home position.

15. CAN

Name：clear cursor line, and clear string mode

ACSII：CAN

Decimal：24

Hex：18

Description：Clears the line containing the cursor.After this command is executed, the cursor moves to the left-end position on the current line.

16. US C n

Name：set cursor ON/OFF

ACSII： US C n

Decimal：31 67 n

Hex：1F 43 n

Description：Turns the cursor on or off.

When n =0, the cursor is turned off.

When n =1, the cursor is turned on.

17. US . n

Name：display char ‘n’ and ‘.’

ACSII：US . n

Decimal：31 46 n

Hex：1F 2E n

Description：20H<=n<=FFH

18. US , n

Name：display char ‘n’ and ‘,’

ACSII：US , n

Decimal：[031][044]n

Hex：[1FH][2CH]n

Description：20H<=n<=FFH

19. US ; n

Name：display char ‘n’ and ‘;’

ACSII：US ; n

Decimal：31 59 n

Hex：1F 3B n

Description：20H<=n<=FFH

20. US X n

Name：brightness adjustment

ACSII：US X n

Decimal：31 42 n

Hex：1F 2A n

Description：Sets the brightness of the vacuum fluorescent character display tube.n selects the percentage of brightness as follows:

n = 1, Brightness Level = 40 %

n = 2, Brightness Level = 60 %

n = 3, Brightness Level = 80 %

n = 4, Brightness Level =100 %

When the power is turned on, *n* =4 is selected defaultly.

21. US E n

Name：Sets or cancels the blink interval of the display screen

ACSII：US E n

Decimal：31 69 n

Hex：1F 45 n

Description：n specifies the blink interval. When n = 0, the display is kept on(cancels blinking).

When n = FF Hex (255 decimal), the display is turned off but the contents of the display are maintained.

When the power is turned on, n = 0 is selected defaultly.

22. ESC R n

Name：select international fonts set

ACSII：ESC R n

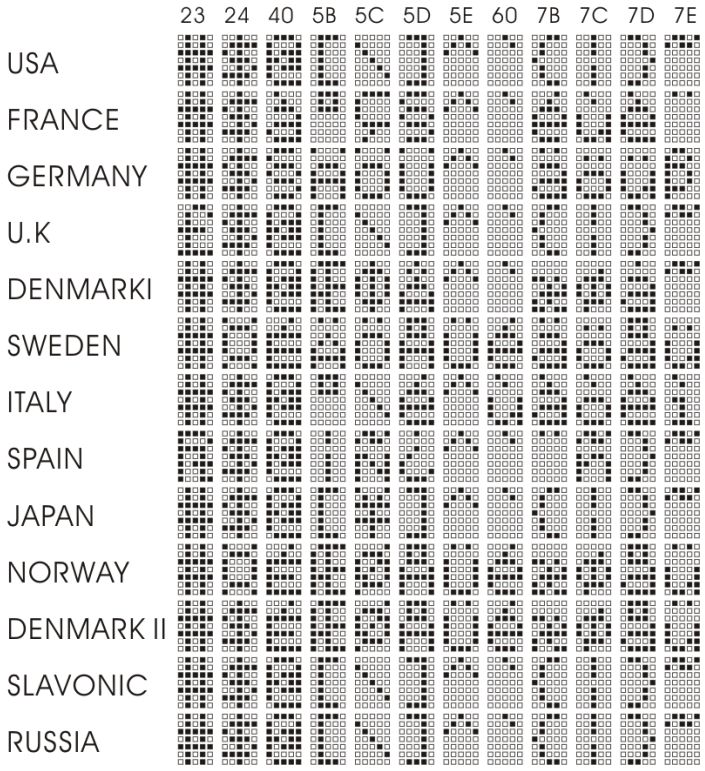
Decimal：[027][082]n 32<=n<=44

Hex：[1BH][52H]n 20H<=n<=2CH

Description：When the power is turned on, the default value of n is SPACE(set to U.S.A.)

Decimal n	Hex n	Country
32	20H	U.S.A
33	21H	FRANCE
34	22H	GERMANY
35	23H	U.K.
36	24H	DENMARKI
37	25H	SWEDEN
38	26H	ITALY
39	27H	SPAIN
40	28H	JAPAN.
41	29H	NORMAY
42	2AH	DENMARKII
43	2BH	SLAVONIC
44	2CH	RUSSIA

国际字符码表（主要列出不同的内容）



23. ESC t n

Name：select fonts ,ASCII code or JIS code

ACSII： ESC t n

Decimal：[027][116] n

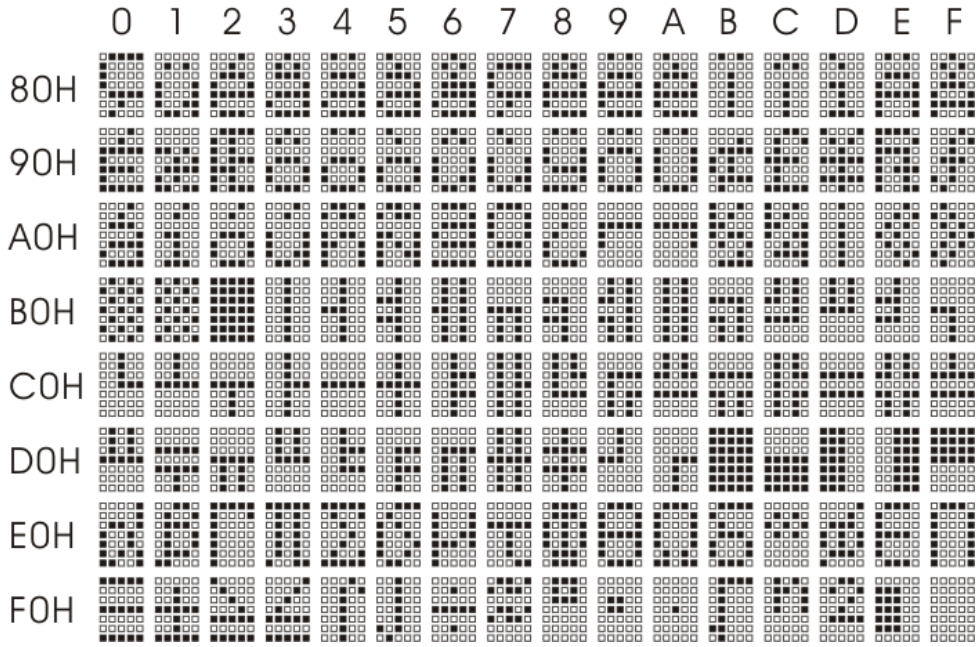
Hex：[1BH][74H] n

Description：When the power is turned on, the default value of n is 0(set to U.S.A. and Standard Europe)

Decimal n	Hex n	character code table(80H…FFH)
0	00H	U.S.A. and Standard Europe
1	01H	Katakana for Japan
2	02H	Multilingual
3	03H	Portuguese
4	04H	Canadian French
5	05H	Nordic
6	06H	SLAVONIC
7	07H	RUSSIA

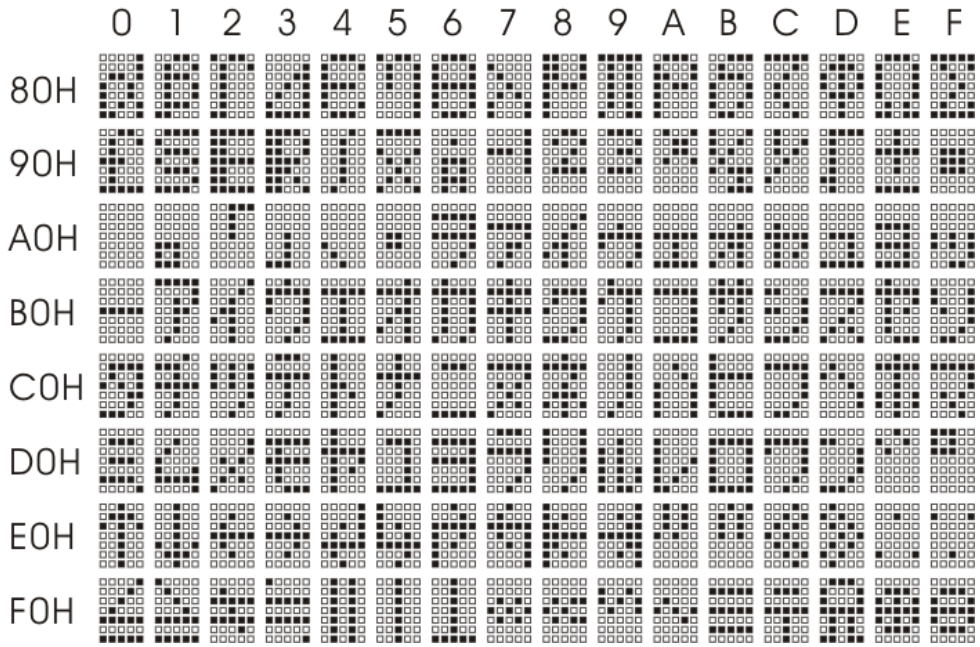
扩展字符字体表

Standard Europe



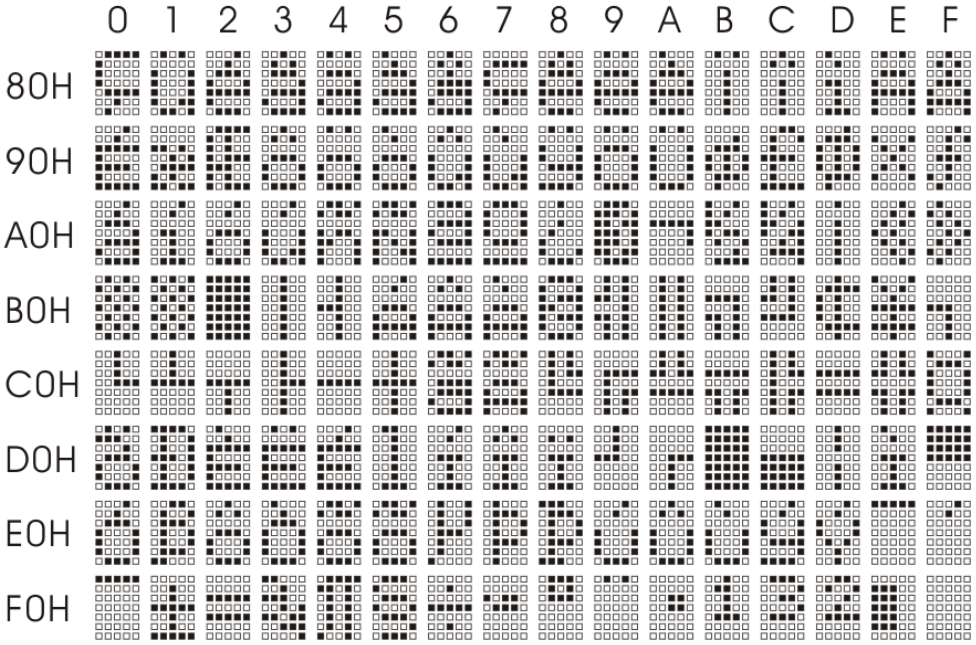
扩展字符字体表

Katakana



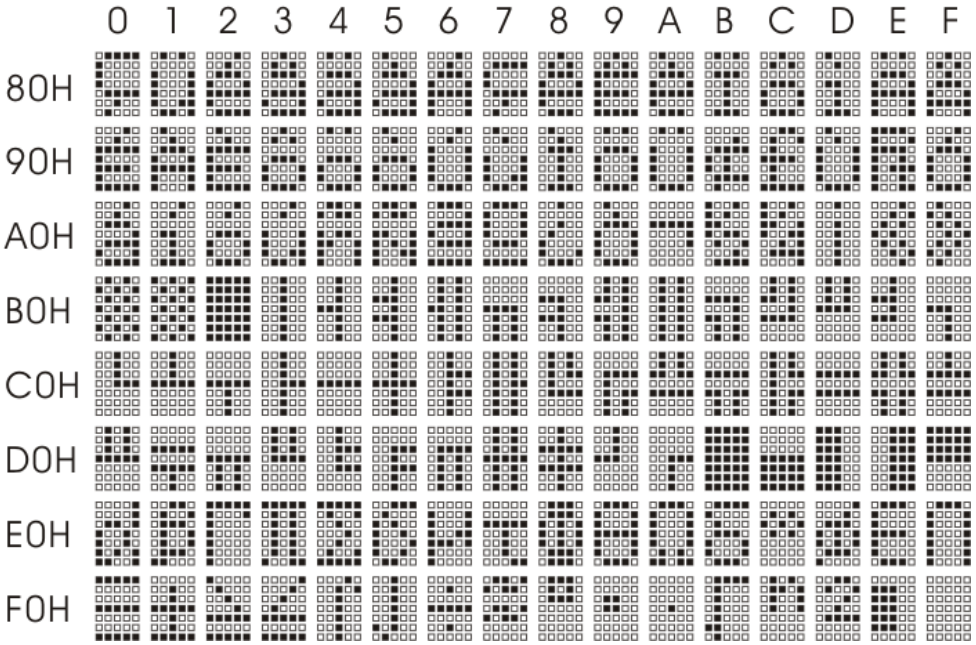
扩展字符字体表

Multingual



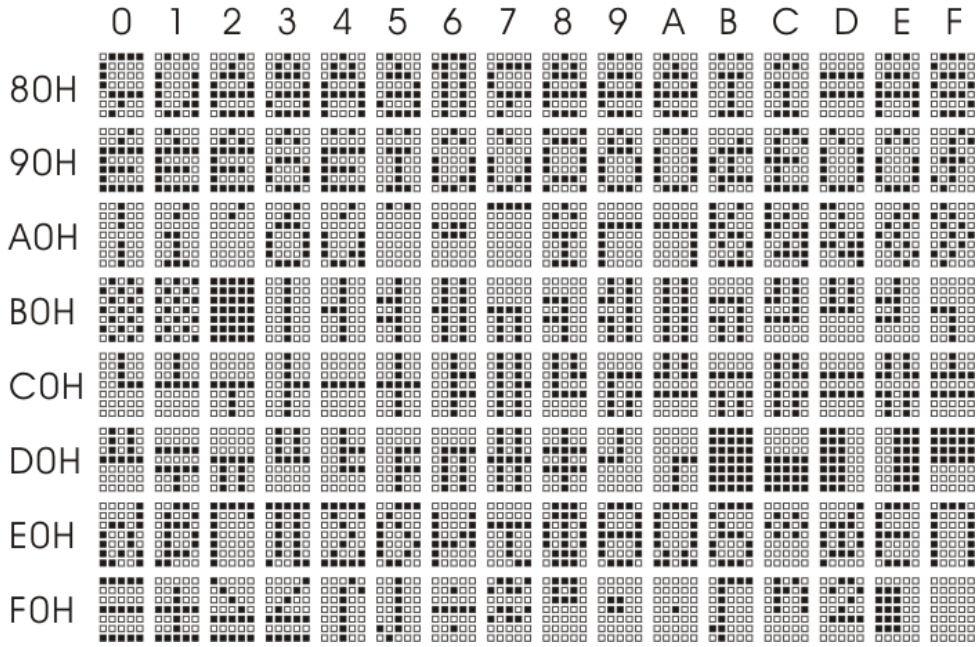
扩展字符字体表

Portuguese



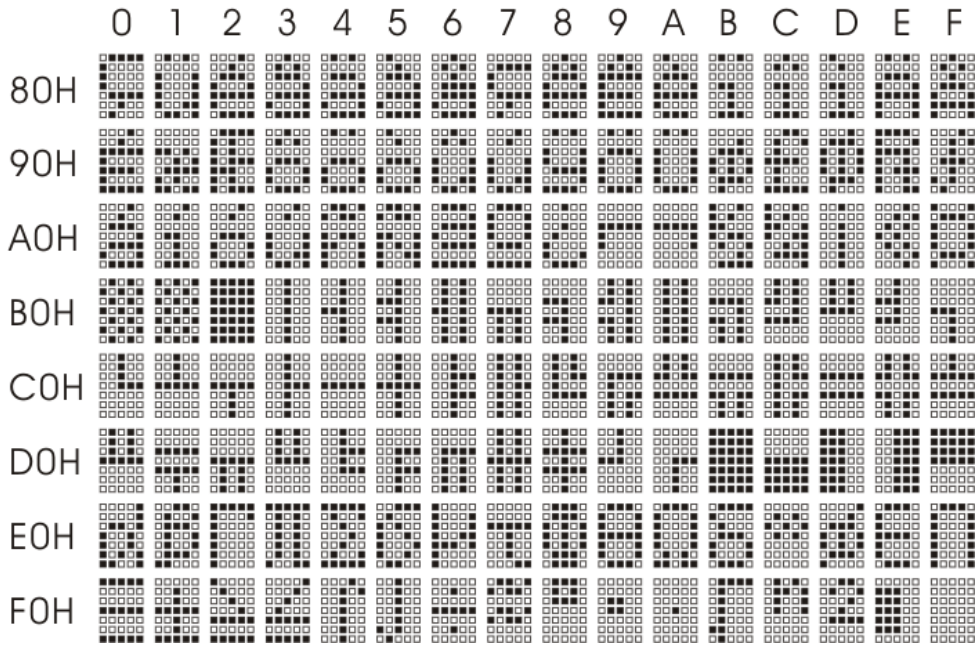
扩展字符字体表

Canadian French



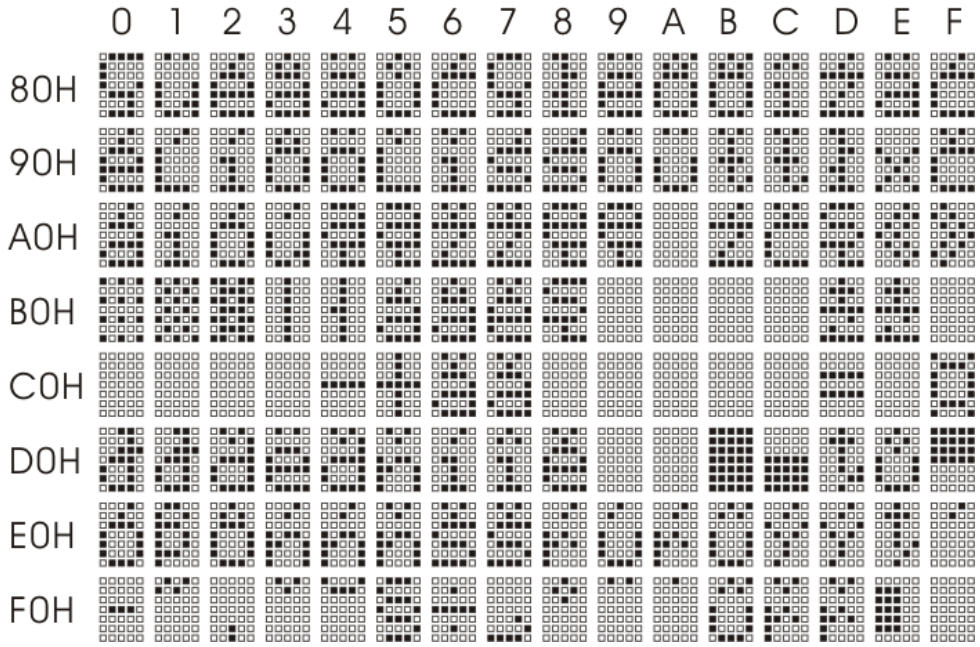
扩展字符字体表

Nordic



扩展字符字体表

SLAVONIC



扩展字符字体表

RUSSIA